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ABSTRACT

Studies of occupational choice and the demand for education conducted by economists have generally focused on the pecuniary cost and earnings streams associated with these choices. It has been recognized that many other factors influence such choices, but models using earnings alone have been fairly successful in predicting these choices for men. This paper examines the returns for women with college education, graduate education, and nurses training. The study examines the following two alternative income streams associated with women's educational and occupational choices: (1) discounted earnings, the traditional measure of returns; and (2) discounted family income resulting from marriage. Tables are presented dealing with: (1) women's mean earnings, husbands' income, and family income in 1959, by women's education and race; (2) values at age 18 of various measures of lifetime income for women by education and race at discount rates of 0%, 5%, and 10%, in $1,000's; (3) internal rates of return to women's education estimated from women's earnings and husbands' income; (4) men's mean earnings, wives' income, and family income in 1959 by men's education; (5) academic degrees earned by sex in 1960-61 and 1964-65; (6) women's mean earnings, husbands' income and family income in 1959 for registered nurses and for other women with 13-15 years of schooling; and (7) number of entrants into registered nurses' training and general college programs in selected years. (Author/HS)

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WOMEN'S ECONOMIC RETURNS FROM COLLEGE, GRADUATE EDUCATION AND NURSES' TRAINING THROUGH EARNINGS AND MARRIAGE*

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Studies of occupational choice and the demand for education conducted by economists have generally focused on the pecuniary cost and earnings streams associated with these choices. It has been recognized that many other factors influence such choices, but models using earnings alone have been fairly successful in predicting these choices for men.[1] Little has been done on this question for women.

This paper examines the returns for women with college education, graduate education, and nurses' training.[2] The original impetus for this investigation came from studies which showed the apparent unresponsiveness of registered nurses to changes in rates of return from own earnings during the 1950's and early 1960's.[3] The present study examines two alternative income streams associated with women's educational and occupational choices: discounted earnings, the

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[1] See Richard Freeman, The Market for College-Trained Manpower (Cambridge, Mass: Harvard University Press, 1971).

[2] Data are from the 1/1000 sample of the 1960 U. S. Census.

[3] See Donald E. Yett, "Lifetime Earnings for Nurses in Comparison with College Trained Women," Inquiry, V (December, 1968), 35-70, and "Causes and Consequences of Salary Differences in Nursing," Inquiry, VII (March, 1970), 78-99.

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traditional measure of returns, and discounted family income resulting from marriage. The assertion has frequently been made that the principal economic benefit which women derive from higher education is through marriage to men who have higher lifetime incomes. If significant returns through marriage are associated with women's educational and occupational choices, an understanding of these returns should provide further insight into these choices. Some rough comparisons below of these income streams and patterns of educational attainment and occupational choice offer preliminary evidence on this point.

I.

Returns to level of educational attainment will be investigated first. Since a large proportion of women are active in the labor force only part of the time, and no direct measures of nonmarket productivity are available,[1] three measures of women's market earnings are presented: earnings for all women, earnings for women working full time, and earnings for women never married. Table 1 shows these earnings in 1959 by race for 11, 12, 13-15, 16, and 17+ years of education. Present value estimates for a subset of these groups are shown in Table 2, and rates of return in Table 3.[2]

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[1] For a discussion of the recent work on nonmarket returns to education, see T. W. Schultz, Human Capital: Policy Issues and Research Opportunities (New York: National Bureau of Economic Research, Columbia University Press, 1972).

[2] The important question of the returns to post-school investment is not considered here. See Jacob Mincer, Schooling, Age, and Earnings (New York: National Bureau of Economic Research, 1972). Solomon Polachek at the University of Chicago is currently studying the effects of post-school investment on women's earnings.

TABLE 1

WOMEN'S MEAN EARNINGS, HUSBANDS' INCOME, AND FAMILY INCOME IN 1959, BY WOMEN'S EDUCATION AND RACE[a]

Years of Schooling Completed by Women	Mean 1959 Earnings of All Women, in Dollars[b]	Mean 1959 Earnings of Women Working Full Time, in Dollars[b]	Mean 1959 Earnings of Never-Married Women, in Dollars[b]	Percent of Women Married with Husband Present	Mean Education of Husbands, in Years	Mean 1959 Total Income of Husbands, for Women with Husbands, in Dollars	Mean 1959 Family Income[e] Including Weighted Husbands' Income, in Dollars	Mean 1959 Family Income Including One-Half of Weighted Husbands' Income, in Dollars	N
				White[c]					
11 Years	884	2861	1931	76.0	10.8	5897	5366	3125	2792
12 Years	1104	3116	2322	76.6	12.0	6684	6224	3654	16259
13-15 Years	1291	3560	2595	73.8	13.6	8449	7526	4409	4905
16 Years	1722	4283	3442	72.3	15.3	10634	9410	5566	2206
17+ Years	3243	5184	4085	51.7	15.7	10415	8628	5935	812
				Negro[d]					
11 Years	794	1902	751	60.3	9.2	3152	2695	1744	363
12 Years	978	2249	1006	57.0	10.5	3621	3042	2010	896
13-15 Years	1151	2647	1305	53.7	11.1	4128	3368	2259	218
16 Years	2393	3562	2478	56.3	13.4	4891	5147	3770	103
17+ Years	3738	4831	5412	59.5	14.0	4220	6249	4994	42

[a]Calculated for women of ages 18-65 not enrolled in school at the time of the 1960 census.

[b]Mean wage and salary and self-employment income.

[c]Excluding those with Spanish surnames.

[d]The sample size is small for some of the education cohorts in this group, especially for women working full time and for never-married women.

[e]Earnings of woman plus total income of husband weighted for probability at each age of woman that husband is present.

TABLE 2

PRESENT VALUES AT AGE 18 OF VARIOUS MEASURES OF LIFETIME INCOME FOR WOMEN BY EDUCATION AND RACE AT DISCOUNT RATES OF ZERO PER CENT, FIVE PER CENT, AND TEN PER CENT, IN $1,000's[a]

Years of Schooling Completed by Women	Earnings of All Women			Earnings of Women Working Full Time			Earnings of Never-Married Women			Weighted Income of Husbands[c]			Family Income[d]			Family Income Including Only Half of Husband's Income[e]		
	0%	5%	10%	0%	5%	10%	0%	5%	10%	0%	5%	10%	0%	5%	10%	0%	5%	10%
White[b]																		
11 Years	44.0	14.8	7.3	132.1	50.0	26.9	118.4	43.7	22.5	213.3	77.3	38.8	257.3	92.1	46.1	150.6	53.4	26.7
12 Years	54.3	20.4	11.2	146.5	53.3	28.0	130.6	48.6	25.1	239.3	83.6	40.0	293.6	104.0	51.2	173.9	62.2	31.2
13-15 Years	61.7	21.2	10.6	159.7	54.2	26.1	145.5	49.9	23.6	286.8	97.5	44.1	348.5	118.7	54.7	205.1	70.0	32.6
16 Years	81.5	25.0	11.3	181.1	59.3	27.0	170.4	56.3	25.4	339.8	108.6	45.4	421.3	133.6	56.7	251.4	79.3	34.0
17+ Years	133.6	40.6	17.1	205.7	62.4	26.2	176.3	55.9	23.8	220.2	71.5	29.6	353.8	112.1	46.7	243.7	76.4	31.9
Negro																		
11 Years	41.1	14.0	6.7	81.5	31.2	16.7	f	f	f	90.9	32.2	16.1	132.0	46.2	22.8	86.5	30.1	14.7
12 Years	44.7	16.7	8.4	96.0	36.7	19.5	f	f	f	95.2	35.4	17.7	139.9	52.1	26.1	92.3	34.4	17.2
13-15 Years	48.8	18.2	9.0	120.3	38.1	17.1	f	f	f	99.5	35.2	16.5	148.3	53.4	25.5	98.6	35.8	17.2
16 Years	127.3	37.3	15.8	159.8	50.7	22.7	f	f	f	121.0	43.2	19.0	248.3	80.5	34.8	197.8	58.9	24.3
17+ Years	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f	f

[a] Calculated for women of ages 18-65 not enrolled in school at the time of the 1960 census.

[b] Excluding those with Spanish surnames.

[c] Calculated from income of husbands of women in each age and education cell weighted by the probability that women in that cell are married.

[d] Family income = earnings of all women + weighted income of husbands.

[e] Family income including only half of husbands' income = earnings of all women + $\frac{1}{2}$ (weighted income of husbands).

[f] Number of observations too small to calculate present values.

TABLE 3

INTERNAL RATES OF RETURN TO WOMEN'S EDUCATION ESTIMATED FROM WOMEN'S EARNINGS AND HUSBANDS' INCOME[a]

Women's Higher Schooling Level of Comparison	Internal Rate of Return from Own Earnings for All Women			Internal Rate of Return from Own Earnings for Women Working Full Time			Internal Rate of Return from Husbands' Income for All Women		
	Women's Lower Schooling Level of Comparison			Women's Lower Schooling Level of Comparison			Women's Lower Schooling Level of Comparison		
	12 Years	13-15 Years	16 Years	12 Years	13-15 Years	16 Years	12 Years	13-15 Years	16 Years
White[b]									
13-15 Years	7%			6%			17%		
16 Years	10%	14%		9%	11%		14%	12%	
17+ Years	18%	25%	44%	8%	10%	8%	negative	negative	negative
Negro									
13-15 Years	18%			6%			5%		
16 Years	35%	> 50%		15%	> 50%		12%	18%	
17+ Years	c	c	c	c	c	c	c	c	c

[a]Calculated for women of ages 18-65 not enrolled in school at the time of the 1960 census.

[b]Excluding those with Spanish surnames.

[c]Number of observations too small to calculate rates of return.

Husbands' income and family income by women's education and race are also calculated, with two measures of family income included. The first is the earnings of the woman plus the total income of her husband, weighted by the probability for each age of the woman that the husband is present.[1] The second measure differs from the first in that only half of the weighted husband's income is included.

For white women, the most striking feature in the tables is that the absolute differences in women's own earnings as a function of their own education were small relative to the absolute differences in their husbands' incomes. The difference ($3950) between the annual incomes of husbands of high school and college graduates in 1959 was almost as large as the level ($4283) of full time earnings of female college graduates, and several times as large as the difference between the earnings of women at these two educational levels working full time ($1167). The income of husbands rose consistently with wives' education,

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[1] If the view is taken that pecuniary returns alone should be considered in these calculations, then care must be taken to avoid double-counting, i.e., attributing the same income to both husband and wife. However, if a measure of full income also includes the returns to nonmarket activity, then including all the husband's pecuniary earnings in a measure of the returns to the wife's education is not necessarily double-counting, provided that the nonmarket productivity of the husband is positively related to his earnings and his wife shares this nonmarket output. Depending on the effects of education on nonmarket productivity, the returns to women's education may even be some multiple of the total pecuniary returns of both husband and wife. I am grateful to Gary Becker for assistance on this point.

Furthermore, while this analysis is concerned only with the returns to women from family income, there should be no implication that women are the principal beneficiaries of marriage. Married women have traditionally been in the labor market less than married men, and hence nonmarket activities have comprised a larger component of their total productivity than has been the case for men.

except for women with more than 16 years of schooling. The rates of return to college also appeared higher when husbands' incomes were considered than when women's own earnings were used. For example, in the case of women with one to three years of college, the rates of return from own earnings were 6 per cent and from husbands' incomes 17 per cent. For graduate education, however, returns through own earnings were positive, but negative through husbands' incomes.[1]

For Negro women, the pattern was different. Their husbands' incomes generally differed less across wives' education than did women's own earnings. Also, a lower percentage of Negro women were married with husband present. There was a differential of $1270 in average annual income between husbands of women who had 16 years of education and husbands of women with 12 years, for those married with husband present. This compares with a differential of $1415 in women's own earnings and $1313 in earnings for women working full time. The rates of return for college education are shown in Table 3.

To examine the influence which expected family income has on educational choices, it would be desirable to estimate the responsiveness

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[1] The negative rate of return through husbands' income to women's graduate education was due in part to the low marriage rate of women with graduate training. Even if this were not the case, the returns would still be quite low, because the mean income of husbands of women with graduate training was lower than the mean income of husbands of women with 16 years of education. Total family income for 1959 was slightly higher for women with graduate education because their own earnings were higher than those of women with 16 years of education.

of women to changes in these family returns. Unfortunately this is not possible with the cross-sectional data at hand. However, a simple but suggestive test can be applied in one instance in which women's returns from own earnings and from family income move in opposite directions: the change from 16 to 17+ years of education. The more that family income as opposed to own earnings influences choice, the fewer the women we would expect to continue past 16 years of schooling. Since education is a sequential process, there will in any case be fewer women with 17+ years of education than with 16 years, regardless of the relative returns, so some standard of comparison is needed. One possibility is to compare women's continuation rates with those of men, who appear to have positive returns to graduate education in terms of both own earnings and family income[1] (Table 4). Estimated returns to graduate education for women from own earnings appeared in 1959 to be in the same range as those estimated for men, while the returns from family income for women appeared negative. Therefore, to the extent that women's educational choices are made on the basis of expected family income rather than own earnings, we

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[1] Other estimates of returns to graduate education from men from own earnings have shown at least positive returns. Yoram Weiss obtained rates of return of from 10 per cent to 12.5 per cent for graduate studies in the natural and social sciences. Bailey and Schotta examined only academic careers, which are likely to have lower pecuniary returns than nonacademic careers for individuals with graduate education. They estimated private real rates of return of from 0 per cent to 1 per cent for academicians. See Yoram Weiss, "Investment in Graduate Education," American Economic Review, LXI, 5 (December, 1971), 833-52. Also see Duncan Bailey and Charles Schotta, "Private and Social Rates of Return to Education of Academicians," American Economic Review, LXII, 1 (March, 1972), 19-31.

TABLE 4

MEN'S MEAN EARNINGS, WIVES' INCOME, AND FAMILY INCOME IN 1959 BY MEN'S EDUCATION[a]

Years of Schooling Completed by Men	Mean 1959 Earnings of All Men, in Dollars[b]	Mean 1959 Earnings of Men Working Full Time, in Dollars	Percent of Men Married with Wife Present	Mean Education of Wives, in Years	Mean 1959 Total Income of Wives, for Men with Wives, in Dollars	Mean 1959 Family Income[c] Including Weighted Wives, Income, in Dollars	Mean 1959 Family Income Including One-Half of Weighted Wives' Income, in Dollars	N
12 Years		6071	75.4	11.9	951	5772	5413	11865
13-15 Years	6396	7643	79.3	12.8	1182	7333	6864	4217
16 Years	8362	9683	81.6	13.9	1009	9185	8774	2602
17+ Years	10297	11610	84.4	14.6	1200	11310	10803	1965

[a]Calculated for men, excluding Negroes, of age 18 or over not enrolled in school at the time of the 1960 Census.

[b]Mean wage and salary and self-employment income.

[c]Earnings of man plus total income of wife weighted for probability that wife is present.

would expect the ratio of female to male degree recipients in that period to be much lower for graduates than for undergraduates.

The numbers of degrees earned in 1960-61 and 1964-65 by sex are given in Table 5. In 1960-61, the ratio of female to male B.A. recipients was .64, and the comparable combined ratio for first professional degrees requiring five years or more, master's degrees, and doctor's degrees was .30. Furthermore, by 1964-65, the ratio of female to male B.A. recipients rose to .76, while the corresponding ratio for higher degrees increased only to .33. These results are consistent with the thesis that expected family income influences women's educational choices.

II.

In recent years a considerable effort has been made to understand and predict manpower flows into various fields, including professions in the medical sector. Some anomalous results have been obtained in the case of registered nurses, who appear to be relatively unresponsive to changes in rates of return on earnings.[1] The family incomes of registered nurses are examined here to see if they provide some insight into the observed patterns of behavior.

Table 6 shows the returns in terms of own earnings and family income for registered nurses and for other women with 13-15 years of education.[2]

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[1] See Lee Benham, "An Economic Analysis of the Labor Market for Registered Nurses," (unpublished Ph.D. dissertation, Department of Economics, Stanford University, 1970). Also see Don Yett, op. cit.

[2] The sample size of registered nurses with more than three years of training was too small for separate analysis.

TABLE 5

ACADEMIC DEGREES EARNED BY SEX
IN 1960-61 AND 1964-65

Degree Recipients	Bachelor's Degree[b]	First Professional Degree[c]	Master's Degree	Doctor's Degree
		1960-61		
Women	141,910	3,974	24,111	1,112
Men	223,427	32,473	54,158	9,463
Women/Men	.64	.12	.45	.12
		1964-65		
Women	213,207	6,053	35,984	1,775
Men	279,777	39,895	76,211	14,692
Women/Men	.76	.15	.47	.12

[a]Source: Department of Health, Education and Welfare, Office of Education, Annual Report "Earned Degrees Conferred 1964-65," p. 4.

[b]Requiring four but less than five years of education.

[c]First professional degree requiring five or more years.

TABLE 6

WOMEN'S MEAN EARNINGS, HUSBANDS' INCOME AND FAMILY INCOME IN 1959 FOR REGISTERED NURSES AND FOR OTHER WOMEN WITH 13-15 YEARS OF SCHOOLING[a]

Category of Women	Mean 1959 Earnings of All Women, in Dollars	Mean 1959 Earnings of Women Working Full Time, in Dollars	Percent of Women Married with Husband Present	Mean Education of Husbands, in Years	Mean 1959 Total Income of Husbands, in Dollars	Mean 1959 Family Income[b] Including Weighted Husbands' Income, in Dollars	Present Values at Age 18 of Earnings of All Women, in $1,000's, at Discount Rates of			Present Values at Age 18 of Earnings of Women Working Full Time, in $1,000's, at Discount Rates of			Present Values at Age 18 of Family Income, in $1,000's, at Discount Rates of			N
							0%	5%	10%	0%	5%	10%	0%	5%	10%	
Registered Nurses with 13-15 Years of Schooling	2118	3892	76.1	13.5	6099	6760	103.8	35.0	17.4	171.6	59.7	29.3	274.3	101.9	50.2	314
All Women with 13-15 Years of Schooling Except Registered Nurses	1236	3794	73.7	13.6	8596	7579	59.1	20.2	10.1	170.0	58.1	28.2	352.0	119.5	55.0	4645

[a] For women, excluding Negroes, of age 18 or over not enrolled in school at the time of the 1960 Census.

[b] Earnings of woman plus total income of husband weighted for probability at each age of woman that husband is present.

Nursing looks reasonably attractive when women's earnings streams alone are considered, but quite unattractive when expected husbands' and family incomes are examined. In 1959 the husbands of women with one to three years of general college education earned $2497 more than did husbands of registered nurses. Although the marriage rate for registered nurses was higher and their own earnings were higher, the difference in family income remained substantial. Table 7 shows the number of entrants into nursing schools and colleges during the early 1960's. The low growth rate of students entering nursing programs compared to those entering college during this period is inconsistent with returns to women's own earnings, but consistent with the associated returns from family income.[1]

III.

It should be noted that the returns through marriage associated with women's educational attainment are also functions of such factors as family background, social class, and parental family income. The problems

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[1] One further aspect of educational choice can be suggestively examined here. While registered nurses in 1959 did not fare well in terms of family income, variations in these returns might be associated with different types of nursing programs attended. The data are not adequate to allow direct measurement, but we would expect that nursing programs located in colleges and universities would offer students advantages more comparable to those of a general college education, in terms of broad education and association with potential marriage partners, than would hospital-based diploma programs. During the 1960's we find there was indeed a rapid trend away from hospital-based programs, with the proportion of nurses trained in college-based programs increasing from 19.6 per cent in 1960 to 58.8 per cent in 1969. (See American Nurses' Association, Facts About Nursing, 1970-71 edition, p. 72.) Other factors probably contributed significantly to this change, including government subsidies to college-based programs and new regulations increasing the cost of hospital-based programs. However, this change also appears consistent with the hypothesis that expected family income is important to training choice.

TABLE 7

NUMBER OF ENTRANTS INTO REGISTERED NURSES' TRAINING AND GENERAL COLLEGE PROGRAMS IN SELECTED YEARS

Category of Education	Academic Year 1960-61	Academic Year 1962-63	Academic Year 1964-65
Female High School Graduations[a]	976,000[c]	991,000	1,337,000
Female College Admissions[a]	383,557	432,455	523,316
Nursing School Admissions[b]	49,219	49,228	57,180

[a]U. S. Bureau of the Census, Statistical Abstract of the United States, appropriate years.

[b]American Nurses' Association, Facts About Nursing, 1970-71 Edition, p. 80.

[c]Mean of female high school graduations in 1959-60 and 1961-62.

of separating the effects of these characteristics from educational attainment are similar to that of separating the returns to ability from those to education. Appropriate background information was not available on this data file to make specific adjustments for background characteristics. Such adjustments if made would probably reduce the pecuniary returns through marriage attributed to women's level and type of education. However, since nonmarket returns have not been included above, and market and nonmarket productivity are likely to be positively correlated, it is not obvious that the above estimates of pecuniary returns overstate the total returns.[1]

These results, fragmentary as they are, suggest that a family income maximization model may be useful in further examination of the demand for education by women. Until women's earnings constitute a larger component of their total pecuniary returns, estimates of returns to women's education calculated from their earnings should be interpreted with caution, particularly when drawing inferences about resource allocation in the labor market for women. The major part of the returns to women (particularly white women) from higher education appeared in 1959 to be from family income rather than from own earnings. As a consequence, we should not be surprised to find a weak supply response of women to changing pecuniary returns on own earnings.

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[1]Some evidence suggests that the observed returns are not due simply to selectivity of marriage partners, but also to independent positive effects of wife's education on husband's earnings, ceteris paribus. See Lee Benham, "Benefits of Women's Education Within Marriage," Journal of Political Economy, forthcoming.